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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,927	04/24/2006	Kohichi Miyashita	101175-00072	2814
4372	7590	11/05/2007	EXAMINER	
ARENT FOX LLP			YAKULIS, JEFFREY C	
1050 CONNECTICUT AVENUE, N.W.			ART UNIT	
SUITE 400			PAPER NUMBER	
WASHINGTON, DC 20036			1795	
			NOTIFICATION DATE	DELIVERY MODE
			11/05/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DCIPDocket@arentfox.com
IPMatters@arentfox.com
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Office Action Summary	Application No. 10/576,927	Applicant(s) MIYASHITA, KOHICHI	
	Examiner Jeff Yakulis	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/24/2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3, and 11, are rejected under 35 U.S.C. 102(b) as being anticipated by Shimamune et al. (6,126,796).

Regarding claims 1, 3, and 11, Shimamune et al. teaches an anion exchange membrane [2] separating an anode chamber [3] having an anode [5] disposed on the membrane [2] and a cathode chamber [4] having a cathode [6] disposed on a membrane [2] forming a membrane-electrode structure (col. 6 lines 52-59, figure 1 and 2), raw water is supplied to the anode chamber [3] and an aqueous hydrochloric acid (chloride electrolyte) is supplied to the cathode chamber [4] and a voltage is applied across each electrode to perform electrolysis and highly acid electrolyzed water is discharged through a pipe running from the top of the anode (col. 6 lines 60-65 and col. 7 lines 12-19).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimamune et al. (6,126,796) as applied to claim 1 above, and further in view of Nawama et al. (JP 2001-259635).

Shimamune et al. teaches all the limitations of claim 1 mentioned above, but fails to disclose an electrolyte being supplied to both sides of the electrolysis chambers.

Nawama et al. teaches an acidic and alkaline water production apparatus (abstract). Nawama et al. teaches an electrolytic solution being poured into both the anode [4] and cathode [2] to produce both alkaline and acidic water allowing for a more compact design (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to feed an electrolytic solution to both the anode and cathode compartments as done by Nawama et al. in addition to the feed stream of the electrolytic solution supplied to the cathode chamber of Shimamune et al. because it would allow for production of both alkaline and acidic electrolyzed water allowing for a more compact design of the electrolysis device.

Regarding claims 4, 5, 9, and 10, Shimamune et al. teaches a porous sintered titanium substrate that can have a mesh-like structure (conductive electrode) with an iridium oxide-based material coating being used as the anode electrode being applied to an anion exchange membrane (col. 4 lines 38-39 and col. 5 lines 10-18) but fails to disclose using this type of electrode for the cathode side electrode.

Nawama et al. teaches an acidic and alkaline water production apparatus (abstract), while Shimamune et al. teaches only an acidic water being produced on the

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anode side of the electrolysis cell (figure 1 and example 1). Shimamune et al. teaches an anode material comprising a porous sintered titanium substrate with an iridium oxide-based material coating is useful if contamination as a result of materials eluted from the electrode is undesirable (col. 5 lines 8-18).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the porous sintered/mesh-like titanium electrode with an iridium oxide-coating as both the cathode and anode of choice in the water electrolysis apparatus taught by Shimamune et al. because it would allow for prevention of contamination of materials eluted from the electrodes during electrolysis in the produced electrolyzed water stream and because Nawama et al. produces a product in both the cathode and anode side of the electrolysis cell one of ordinary skill would appropriately choose electrode materials to prevent contamination of the product alkaline and acidic electrolyzed water streams.

5. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimamune et al. (6,126,796) and Nawama et al. (JP 2001-259635) as applied to claim 4 above, and further in view of de Nora et al. (4,146,438) and Kourtakis (6,939,640).

Regarding claims 6-8, modified Shimamune et al. teaches all the limitations of claim 4 above but fails to disclose a titanium compound forming the base electrode material and a catalyst dispersed within the base electrode material.

De Nora et al. teaches a variety of metal oxycompounds including titanium being useful as electrodes for electrochemical processes such as electrolysis of aqueous chloride solutions (col. 3 lines 48-62 and col. 4 lines 51-55). De Nora et al. further

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teaches the addition of an electroconductive matrix to the sintered ceramic electrodes such as nitrides and carbides of valves metals like titanium is useful for improving conductivity (col. 4 lines 7-24). The addition of an electrocatalyst can be made such as platinum or iridium (col. 4 lines 24-31) and can be added to the powder mix prior to sintering allowing for an enriched electrocatalyst layer on the surface of the electrode (col. 4 lines 24-47 and col. 6 lines 53-62).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to disperse powdered titanium nitride and carbide and electrocatalysts such as platinum or iridium into a metal oxycompound matrix and sinter it to make a porous electrode structure as done by de Nora et al. and use it as the electrode taught by Shimamune et al. because it would allow for increased conductivity and an enriched electrocatalyst to form on the surface of the electrode while still providing for an electrode suitable for electrolysis of aqueous chloride solutions.

Regarding claim 6, modified Shimamune et al. teaches all the limitations of claims 6 but fails to disclose a binder allowing for the porous material to form integrally on the membrane.

Kourtakis teaches electrode electrocatalysts useful for applying to an ion exchange membrane containing platinum mixed with carbide compounds (col. 4 lines 5-11 and col. 1 lines 16-31). Kourtakis further teaches the electrocatalyst coating composition further comprises a binder and a solvent; where the binder assists by helping to secure the electrocatalyst electrode to the ion exchange membrane (col. 7 lines 48-58 and col. 11 lines 17-35).

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a binder as taught by Kourtakis to the metal oxycompound, valve metal carbide/nitride, and catalyst mixture taught by modified Shimamune et al. because it would allow for the electrode to be formed on an ion exchange membrane assisting in securing the electrode paste to the membrane.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Thompson et al. (6,297,185), Ichikawa et al (6,872,286), Kuroda JP (2001-073177), and Sawada (6,855,233).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Yakulis whose telephone number is 571-272-9807. The examiner can normally be reached on M-F 9:30 AM-7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Harry D. Wilkins, III/
Harry D. Wilkins, III
Primary Examiner
Art Unit 1795

JCY
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